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EXAMINER	
NGUYEN, HUONG Q	
ART UNIT	**PAPER NUMBER**
3736	

DATE MAILED: 12/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/613,116	GOSWAMI, AMBARISH	
	Examiner	Art Unit	
	Helen Nguyen	3736	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12/07/2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07/03/2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/10/03, 01/18/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1-5, 10-11, 13-14** are rejected under 35 U.S.C. 102(b) as being anticipated by Kupfer et al (US Pat No. 6152890). In regards to **Claim 1**, Kupfer et al disclose a method of synchronizing one or more sets of data, wherein each set of data comprises body position representations on a left and a right side of the body spanning a movement. In particular, Kupfer et al teach "the synchronous sampling of the body angles" (Col.5, line39-40), specifically left and right knee and hip angle data (Col.6, line 8-10), collected during a "sequence of movements" (Col.8, line 6-13) as illustrated in Figure 15. Kupfer et al also disclose calculating a value based upon the one or more synchronized sets of data such as acceleration and velocity components as well as joint forces and moments (Col.5, line 44-47).

3. In regards to **Claim 2**, Kupfer et al disclose the body positions as angles of joints, specifically knee and hip angles (Col.6, line 8-10). In regards to **Claim 3**, Kupfer et al disclose the body positions as angles of corresponding joints, specifically the left and right knee and hip angles (Col.6, line 8-10). In regards to **Claim 4**, Kupfer et al disclose the movement comprising of one or more cycles, wherein one cycle is defined as a repeatable sequence of movement, referred to as an "activity sequence," as explained in further detail in Figure 15 (Col.8, line 6-13). The inherent repeatability of all movements constitutes the above mentioned as a cycle. In

regards to **Claim 5**, Kupfer et al disclose creating a figure by graphing the body position representations (knee and hip angle movement) in the synchronized set of data as shown in Figure 16.

4. In regards to **Claim 10**, Kupfer et al disclose comparing the calculated value (i.e. acceleration and velocity components) to a corresponding calculated value of a baseline movement, referred to as a "standard value" (Col.5, line 49-51). In regards to **Claim 11**, Kupfer et al disclose synchronizing a set of data comprising of associating body position representations such that associated body position representations in two subsets of data each refer to a corresponding event in the movement. Although Kupfer et al only generally disclose taking synchronized samples of the body angle data (Col.5, line39-40), due to the nature of the left and right body angle data collected, it is inherent that the body position data of both the left and the right knee or hip would be "synchronized" to refer to a corresponding event in the movement.

5. In regards to **Claim 13**, Kupfer et al disclose a system comprising of a synchronizing module to synchronize one or more sets of data, referred to as "equipment for synchronous sampling," wherein each set of data comprises body position representations on a left and a right side of the body spanning a movement, as previously explained. This is outlined in Claim 20 of the disclosure (Col.11, line 8-14). Kupfer et al also disclose a calculating module to calculate a value based on the one or more synchronized sets of data, referred to as "equipment for determining forces" (Col.12, line 9). The determined forces are calculated from body angle data, as explained in further detail in Col.7, line 52-60.

6. In regards to **Claim 14**, Kupfer et al disclose automating the process to determine values based upon the measured body angle data (Col.2, line 37-40). Although Kupfer et al do not

explicitly state the automation process to include synchronizing the aforementioned sets of data, due to the nature of the left and right body angle data collected, it is inherent that the body position data of both the left and the right knee or hip would be "synchronized" to refer to a corresponding event in the movement. Such inherency necessitates the inclusion of synchronizing the data into the automation process. Because the natural result of any automation process is a computer program product including a computer readable medium, it follows that Kupfer et al disclose such comprising of instructions to synchronize one or more sets of data and to calculate a value based upon the data.

7. **Claims 1-8, 10-14** are also rejected under 35 U.S.C. 102(b) as being anticipated by Hershler et al (*Angle-Angle Diagrams in the Assessment of Locomotion*). In regards to **Claim 1**, Hershler et al disclose a method for quantifying body positions comprising of synchronizing one or more sets of data, wherein each set of data comprises body position representations on a left and a right side of the body spanning a movement. In particular, Hershler et al teach the collection of hip and knee angle data of both sides (i.e. the left and right) of each subject during walking (pg.117). Although Hershler et al do not explicitly disclose synchronizing the data, all data collection inherently includes synchronization of some sort. In this case, due to the nature of the bilateral data obtained, it is necessary to synchronize the left and the right side data for proper collection and analysis. Hershler et al also disclose calculating a value based upon the one or more synchronized sets of data such as area (A) and perimeter (P) (pg.117).

8. In regards to **Claim 2**, Hershler et al disclose the body positions as angles of joints, specifically hip and knee angles (pg.117). In regards to **Claim 3**, Hershler et al disclose the body positions as angles of corresponding joints, referred to as "both sides of each subject," i.e. the left

and right hip and knee angles (pg.117). In regards to **Claim 4**, Hershler et al disclose the movement comprising of one or more gait cycles (pg.117). In regards to **Claim 5**, Hershler et al disclose creating a figure by graphing the body position representations in the synchronized set of data (Figure 4). In regards to **Claim 6**, Hershler et al disclose the figure as a cyclogram, referred to as an "angle-angle diagram" (Figure 4). In regards to **Claim 7**, Hershler et al disclose the calculated value as an area (A) of the cyclogram or angle-angle diagram (pg.111). In regards to **Claim 8**, Hershler et al disclose the calculated value as an orientation of the cyclogram or angle-angle diagram (pg.111).

9. In regards to **Claim 10**, Hershler et al disclose comparing the calculated value, such as area, to a corresponding calculated value of a baseline movement (pg.110). Although Hershler et al do not explicitly state comparison to a baseline movement, all comparisons inherently require at least two sets of data, at least one of which is designated as the baseline, depending upon the nature of the comparison. In regards to **Claim 11**, Hershler et al disclose synchronizing a set of data comprising of associating body position representations with one another such that associated body position representations in two subsets of data each refer to a corresponding event in the movement. Although Hershler et al do not explicitly disclose associating hip and knee angle data of both sides of each subject (pg.117), due to the nature of data collected from both sides, it is inherent that the body position data of both the left and the right hip and knee would be "synchronized" to refer to a corresponding event in the walking movement.

10. In regards to **Claim 12**, Hershler et al disclose a method for quantifying joint angles comprising of obtaining a set of data entries consisting of one or more pairs of angle measurements for a left and a corresponding right joint at a same point in time spanning the

cycle of movement, synchronizing the data entries, generating a cyclogram, calculating a characteristic of the generated cyclogram, and comparing the characteristic to a corresponding characteristic of a cyclogram representing a perfectly symmetrical gait. As mentioned beforehand, Hershler et al disclose a method of collecting joint angle measurement pairs of both sides (the left and right) of a subject at the same time, spanning a walking cycle. Although Hershler et al do not explicitly disclose synchronizing the data, due to the nature of the bilateral data obtained, it is necessary to synchronize the left and the right side data for proper collection and analysis. Hershler et al also disclose generating a cyclogram, calculating a characteristic (such as area), and then comparing the value to a corresponding characteristic. Although Hershler et al do not specifically state the comparison to that of a cyclogram representing a perfectly symmetrical gait, Hershler et al disclose that it is of interest to compare such data with those for pathological conditions (pg.123). Since it is well known in the art that individuals with pathological gait problems do not have a symmetrical gait, comparison of cyclogram characteristics with those having pathological conditions would equate to a comparison of cyclogram characteristics of one with a perfectly symmetrical gait.

11. In regards to **Claim 13**, Hershler et al disclose a system for quantifying body positions comprising of a synchronizing module that synchronizes the aforementioned data and a calculating module that calculates a value based on the one or more synchronized sets of data. Specifically, Hershler et al disclose a minicomputer that is programmed to compute relevant values from the stored data (pg.109). Although Hershler et al do not explicitly disclose a synchronizing module, because synchronization of the data is necessary for proper analysis, as previously explained in the rejection of Claims 1 and 12 by Hershler et al, the calculating module

must be capable of synchronizing the data prior to calculation of values and thus can be referred to as such.

12. In regards to **Claim 14**, Hershler et al disclose a computer program product, including a computer readable medium, for quantifying body positions. Hershler et al disclose computer programs written in Fortran IV language for calculating a value, such as area, based upon the sets of data (pg.117-118). Although the computer program is not explicitly disclosed with the function of synchronizing the one or more sets of data, because synchronization of the data is necessary for proper analysis, the computer program must be capable of synchronizing the data prior to calculation of values and thus can be referred to as such, as explained above.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kupfer et al in view of Au (US Pat No. 4813436). Kupfer et al disclose creating a figure by graphing the body position representations in the synchronized set of data but do not disclose the figure as a cyclogram. Au discloses a cyclogram as an obvious output of data regarding angular position of various joints, such as the knee and hip (Figure 8). Because Kupfer et al already disclose body angle data, such as for the knee and hip, it would have been obvious to one of ordinary skill in the art at the time the invention was made to output data obtained by Kupfer et al in the form of a

cyclogram, as taught by Au, because such data lends itself naturally to expression in the form of a cyclogram.

15. **Claims 7-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kupfer et al in view of Au, further in view of Goswami (*A New Gait Parameterization Technique by Means of Cyclogram Moments: Application to Human Slope Walking*). In regards to **Claim 7**, Au discloses a cyclogram as an output of data regarding angular position of various joints, as previously described (Figure 8), stating that comparison of cyclograms is a good indicator of the motion of a subject (Col.14, line 40-47). However, Au does not disclose calculating a value of area from the cyclogram. Goswami discloses calculating the area of a cyclogram as an indicator of joint movement (pg.17). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to output angle data collected by Kupfer et al in the form of a cyclogram, as taught by Au, and then to calculate a value of area from the cyclogram, as taught by Goswami, to effectively obtain a means to compare motion of a subject.

16. In regards to **Claim 8**, once again Au discloses a cyclogram as an output of body angle data but does not disclose calculating a value of orientation from the cyclogram. Goswami discloses calculating the orientation of a cyclogram as a method to quantify its geometric features (pg.20). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to output angle data collected by Kupfer et al in the form of a cyclogram, as taught by Au, and then to calculate a value of orientation from the cyclogram, as taught by Goswami, to effectively obtain a means to quantify the cyclogram and compare motion of a subject.

17. In regards to **Claim 9**, Au discloses a cyclogram as an output of body angle data but does not disclose calculating a value of minimum moment magnitude from the cyclogram. Goswami discloses calculating the moment magnitude of a cyclogram for shape characterization (pg.3). Although Goswami does not explicitly disclose the calculation of the minimum moment magnitude, it is inherent that any calculation allows for ranges between the minimum and maximum. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to output angle data collected by Kupfer et al in the form of a cyclogram, as taught by Au, and then to calculate a value of minimum moment magnitude from the cyclogram, as taught by Goswami, to effectively obtain a means to characterize the shape of the cyclogram and compare motion of a subject.

18. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kupfer et al in view of Au, further in view of Goswami. As explained above, Kupfer et al disclose obtaining a set of data entries, wherein a data entry is defined as consisting of left and right knee and hip body angles collected at the same time, spanning the movement previously described (Figure 15). Kupfer et al also disclose synchronizing the data entries but do not disclose generating a cyclogram (Col.5, line39-40). Au discloses a cyclogram as an obvious output of data regarding angular position of various joints, such as the knee and hip (Figure 8). Because Kupfer et al already disclose body angle data, such as for the knee and hip, it would have been obvious to one of ordinary skill in the art at the time the invention was made to output data obtained by Kupfer et al in the form of a cyclogram, as taught by Au, because such data lends itself naturally to expression in the form of a cyclogram. Similarly, Au does not disclose calculating a characteristic of the generated cyclogram, but does state that comparison of cyclograms is a good

indicator of the motion of a subject (Col.14, line 40-47). Goswami discloses calculating characteristics of a cyclogram, such as area and moment, for quantitative shape analysis (pg.10). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to output angle data collected by Kupfer et al in the form of a cyclogram, as taught by Au, and then to calculate a characteristic of the generated cyclogram, as taught by Goswami, to effectively obtain a means to compare motion of a subject and conduct shape analysis. Goswami also discloses comparing the characteristic to a corresponding characteristic for identification of pathological conditions (pg.1). Although Goswami does not specifically state the comparison to that of a cyclogram representing a perfectly symmetrical gait, since it is well known in the art that individuals with pathological gait problems do not have a symmetrical gait, identification of pathological conditions would require a comparison of calculated cyclogram characteristics to a corresponding one representing a perfectly symmetrical gait.

19. **Claim 9** is also rejected under 35 U.S.C. 103(a) as being unpatentable over Hershler et al in view of Goswami. Hershler et al disclose calculating a value from a cyclogram or angle-angle diagram as a means of analysis (pg.111), indicating that there are numerous ways to quantify shape (pg.124). However, Hershler et al do not disclose the value as a minimum moment magnitude. Goswami discloses calculating the moment magnitude of a cyclogram for shape characterization (pg.3). Although Goswami does not explicitly disclose the calculation of the minimum moment magnitude, it is inherent that any calculation allows for ranges between the minimum and maximum. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Hershler et al to calculate the minimum

moment magnitude of a cyclogram, as taught by Goswami, to allow another method for quantifying shape.

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yamato et al (US Pat No. 5957870) and Nishibe et al (US Pat Pub No. 2004/0059264) both disclose inventions to analyze walking. Nashner (US Pat No. 6010465) discloses an apparatus and method for characterizing gait.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen Nguyen whose telephone number is 571-272-8340. The examiner can normally be reached on Monday - Friday, 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Max Hindenburg can be reached on 571-272-4726. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HQN

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